REMARKS

Applicant respectfully requests reconsideration of the subject application in view of the amendments and remarks set forth herein.

1. Section 102 Rejections Withdrawn

Applicant notes with appreciation that the Examiner has withdrawn the previously advanced rejections under Section 102 based on U.S. Patent No. 5,804,294 to Gregg et al.

2. Section 103 Rejections

The outstanding Office Action sets forth the following rejections under 35 USC §103(a):

- Claims 1-2, 5-8, 10-13, 20, 22, 24 and 26 stand rejected under 35 USC §103(a) based on U.S. Patent No. 5,370,814 to Salyer (the "Salyer '814 patent") in view of U.S. Patent No. 4,543,281 (the "Pedersen '281 patent");
- Claims 9, 17-19, 23 and 27 stand rejected under 35 USC §103(a) based on the Salyer '814 patent and the Pedersen '281 patent, further in view of U.S. Patent No. 5,453,453 to Lamon et al. (the "Lamon '453 patent');
- Claims 9, 14-16, 23 and 27 stand rejected under 35 USC §103(a) based on the Salyer '814 patent and the Pedersen '281 patent, further in view of the Lamon '453 patent and U.S. Patent No. 4,421,661 to Claar et al. (the "Claar '661 patent"); and
- Claims 9, 21, 23 and 27 stand rejected under 35 USC §103(a) based on the Salyer '814 patent and the Pedersen '281 patent, further in view of the Lamon '453 patent and U.S. Patent No. 5,167,876 to Lem et al. (the "Lem '876 patent").

Each of these obviousness rejections have been advanced in previous Office Actions. Reconsideration of the foregoing Section 103 rejections is respectfully requested.

As noted in applicant's previous submissions, applicant notes that the various tertiary references are generally relied upon by the Examiner to address specific hydroxide materials. Applicant further notes that only the initial obviousness rejection is directed to applicant's independent claims, i.e., claims 1, 22 and 24. In responding to applicant's previous arguments traversing the obviousness rejection of applicant's independent claims, the Examiner states as follows:

> In response to Applicant's argument that the proposed combination lacks teaching that heat absorption is through irreversible decomposition of a hydroxide or that a thermal insulation layer is formed. Pedersen et al specifically teaches that the aluminum oxide absorbs heat through an irreversible decomposition and that the aluminum oxide forms a thermal insulation oxide layer after completely decomposing. (col. 2, l. 8-55).
>
> In response to Applicant's argument that Salyer teaches venting of phase change materials, Salyer is describing materials that change from solid to liquid and eventually gas and therefore require venting to vent the heated gas. However, Pedersen et al teach that aluminum hydroxide is used in place of known PCMs because it absorbs large quantities of heat per amount of material. Aluminum hydroxide as taught by Pedersen et al would not evaporate and vent. Although the water by-product from the decomposition of aluminum hydroxide could vent and allow additional heat to vent with it, the aluminum hydroxide would leave behind aluminum oxide as taught by Pedersen et al. [Office Action, pages 10-11]

With reference to the obviousness rejections directed to independent claims 1, 22 and 24, applicant respectfully submits that the proposed combination of the Salyer '814 patent and the Pedersen '281 patent fails to teach or suggest applicant's claimed article of manufacture and/or combination. In particular, applicant respectfully submits that the outstanding obviousness rejection seeks to pick-and-choose aspects of the two prior art teachings to arrive at applicant's claimed invention, while disregarding teachings that would prevent a skilled artisan from attempting and/or making the proposed combination.

The Salyer '814 patent discloses a phase change material/silica dry powder composite for thermal protection of heat sensitive materials. According to the Salyer '814 patent, the "particle size of the silica is critical" and "at about 70/30 PCM:silica, a free-flowing powder is obtained that remains free-flowing both above and below the melting

temperature of the PCM." [Col 4, lines 56 and 65-68] The Salyer '814 patent discloses two categories of phase change materials: (i) a first category of PCMs wherein "solid-to-liquid" transitions are contemplated (which includes salt hydrates), and (ii) a second category of PCMs wherein "liquid-to-gas" transitions are contemplated (e.g., water and ethylene glycol). [Col. 2, lines 51-68] The Salyer '814 neither contemplates nor teaches a phase change material that undergoes irreversible decomposition. Indeed, for purposes of the Salyer '814 patent, the term "phase change material" references materials that "may be repeatedly converted between solid and liquid phases and utilize their latent heats of fusion to absorb, store and release energy to heat or cool during such phase conversions" [Col. 1, lines 24-27]

In implementations of the Salyer '814 patent that employ "liquid-to-gas" transitions (e.g., water), the Salyer '814 patent provides that the PCM itself -- not a by-product of PCM decomposition -- is vented through a plurality of blow-out vents or plugs.

> A plurality of blow-out vents or plugs 15 are provided in the protective casing 14. The vents 15 release at a predetermined chamber pressure level to provide passages for the vaporized phase change material to exit the chamber 18. [Col. 6, lines 58-62; emphasis added]

> In the case of an aircraft mishap, after the PCM has vaporized and left the chamber 18 via the vents 15, the silica remains and provides an effective layer of insulation through establishing a still air environment that reduces the rate of heat transfer across the chamber 18. With little or no PCM left in the chamber 18, the temperature of the silica will begin to increase from the outer portion of the chamber 18 (adjacent inner wall 14a), to the inner portion thereof. This will cause the dye to degrade and fade to a white color. Thus, the faded silica provides an indication as to how far inward the high temperature boundary has progressed through the silica. [Col. 7, lines8-20; emphasis added]

The Pedersen '281 patent, by contrast, is directed to a fire/flame barrier material that takes the form of a highly filled, polymer-based composite that includes an ethylene copolymer, aluminum hydroxide and calcium and/or magnesium carbonate. Fundamental to the design and operation of the Pedersen barrier material is the fact that water vapor

generated from the aluminum hydroxide "produces a foaming of the polymer matrix." [Col. 2, line 52] Through such foaming process, "[t]he calcium and/or magnesium carbonates together with the aluminum oxide residue are dispersed in the resulting foamed polymer matrix." [Col. 2, lines 52-55] Indeed, the Pedersen barrier material generates "an intumescent layer [that is] formed close to the heat source while the portion of the material remote from the heat source undergoes only the aforementioned endothermic reaction and does not advance to the intumescent stage." [Col. 3, line 18-22]

From the divergent and contradictory teachings of the Pedersen and Salyer patents, the Examiner takes the position that "it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to select aluminum hydroxide as the salt hydrate phase change material, since it is a preferred material for the purpose of providing a fire or flame barrier to heat sensitive devices based on its endothermic properties during decomposition, as taught by Pedersen et al." [Office Action, pages 4-5] The Examiner's use of a "salt hydrate phase change material" as the bridge between the Salyer '814 patent and the Pedersen '281 patent is based on Salyer's statement that a salt hydrate would function as a suitable PCM (as such term is used by Salyer et al.) where "solid-to-liquid transitions are contemplated." [Office Action, page 4; "[t]he phase change material includes salt hydrates (col. 2, l. 54-56)] Applicant respectfully disagrees.

At the time of Applicant's invention, a person of ordinary skill in the art would learn from a careful reading of the Pedersen '281 patent that aluminum hydroxide may be used in a fire/flame barrier system that permits uncontrolled swelling/expansion to form an intumescent layer. The skilled artisan would also learn that water vaporized from the aluminum hydroxide should be captured by and interact with the ethylene copolymer matrix disclosed in the Pedersen '281 patent in connection with the foaming of such copolymer matrix. Based on these teachings alone, the skilled artisan would be dissuaded from further consideration of aluminum hydroxide for use with a flight data recorder

because flight data recorders would not accommodate swelling/expansion, as taught by the Pedersen '281 patent.

Moreover, the skilled artisan would learn from a careful reading of the Salyer '814 patent that a salt hydrate might be used as a phase change material when solid-to-liquid transitions are contemplated. [Col. 2, lines 51-62] The skilled artisan would also learn that a flight data recorder could be protected using a silica/PCM mixture, provided the silica satisfied certain critical particle size parameters, and the PCM could interact with the silica to form a free-flowing powder. Still further, the skilled artisan would learn that, for phase change materials that rely upon a liquid-to-gas transition (e.g., water), the PCM itself could be vented from the enclosure, leaving the silica as an insulative material. Venting of the phase change material is fundamental to the teachings of the Salyer '814 patent because, *inter alia*, "phase change materials may be repeatedly converted between solid and liquid phases and utilize their latent heats of fusion to absorb, store and release energy to heat or cool during such phase conversions" [Col. 1, lines 24-27] and "the volume changes that accompany melting and freezing can cause problems in breaking the containing vessel unless adequate provisions are made to accommodate the volume changes." [Col. 2, lines 7-11]

More fundamentally, the skilled artisan would learn from the Salyer '814 patent that a phase change material -- i.e., a material that may be repeatedly converted between solid/liquid phases to absorb, store and release energy -- may be employed in conjunction with a flight data recorder, and that a salt hydrate might be employed as such phase change material if a solid-to-liquid transition is contemplated.

Based on the foregoing teachings of the Salyer and Pedersen patents, applicant respectfully submits that it would not have been obvious to a person of ordinary skill in the art at the time of applicant's invention to borrow aluminum hydroxide from the Pedersen '281 patent for incorporation into the enclosure of the Salyer '814 patent. To the contrary, a skilled artisan would determine from the Salyer '814 patent that a salt hydrate would be

an appropriate constituent for reversible heat absorption and that such constituent would be effective when a solid-to-liquid transition is desired. Both of these parameters are entirely inconsistent with and contrary to applicant's claimed invention, and would dissuade a skilled artisan to looking to employ the aluminum hydroxide disclosed in the Pedersen 281 patent. Moreover, the skilled artisan would be further dissuaded from making the proposed combination based on the uncontrolled expansion inherent in the system of the Pedersen '281 patent (and the associated formation of a surrounding intumescent layer), in view of the contrary teachings in the Salyer '814 patent.

In short, applicant submits that the outstanding obviousness rejection based on a combination of the Salyer '814 patent and the Pedersen '281 patent is inconsistent with the teachings of the respective patents, as such teachings would have been understood by a skilled artisan at the time of applicant's invention, and reflects a hindsight reconstruction of applicant's claimed invention that disregards substantial contrary teachings in the prior art patents relied upon in advancing such rejection. Accordingly, applicant requests reconsideration and withdrawal of the obviousness rejection based on the Salyer and Pedersen patents.

For at least the foregoing reasons, applicant respectfully submits that applicant's independent claims 1, 24 and 26 patentably distinguish over the proposed Salyer/Pedersen combination. Claims 2-13, 20, 22-23 and 27, which depend directly or indirectly from the noted independent claims, are patentable for at least the reasons noted with respect to such independent claims. Reconsideration and withdrawal of the obviousness rejections based on the Salyer/Pedersen combination are respectfully requested.

With reference to the additional obviousness rejections -- wherein tertiary references are relied upon for their specific hydroxide-related disclosures -- applicant respectfully submits that none of these additional references, whether taken alone or in combination with each other or with the primary/secondary references (i.e., the Salyer '814 patent and/or the Pedersen '281 patent), teaches or suggests applicant's claimed article of

manufacture and/or combination. Accordingly, applicant respectfully submits that the foregoing Section 103 rejections – which are directed to applicant's dependent claims – should be reconsidered and withdrawn because applicant's various dependent claims patentably distinguish over the art of record for at least the reasons noted with respect to independent claims 1, 22 and 24. Reconsideration and withdrawal of the Section 103 rejections are respectfully requested.

Applicant respectfully submits that all claims are in condition for allowance. Prompt action leading to an early Notice to this effect is earnestly solicited. If the Examiner believes that a telephone conversation may be useful in advancing prosecution of this application, he is invited to contact applicant's attorney at the number set forth below.

Respectfully submitted,

Date: November 13, 2007

Basam E. Nabulsi
Reg. No. 31,645
Attorney for Applicant

McCarter & English LLP
Financial Centre, Suite A304
695 East Main Street
Stamford, CT 06901-2138
(203) 399-5920
(203) 399-5820 (fax)